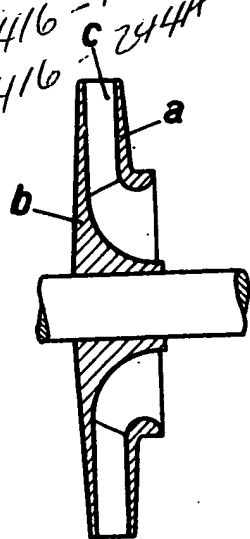
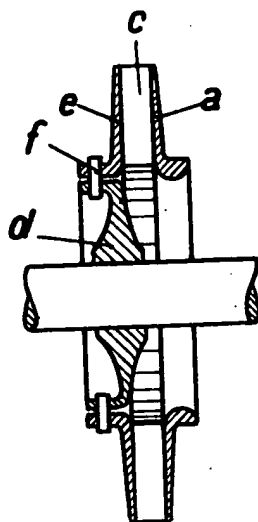
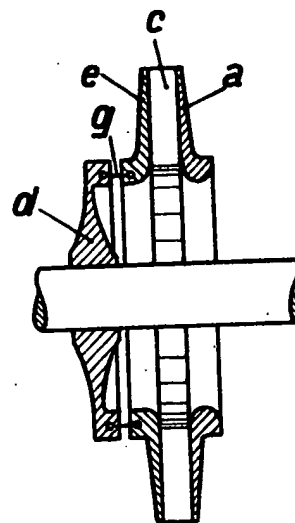
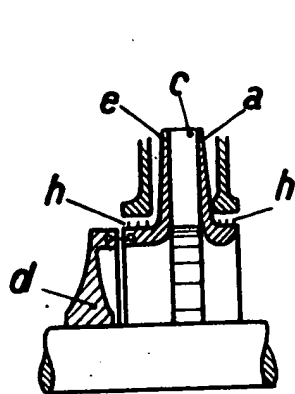
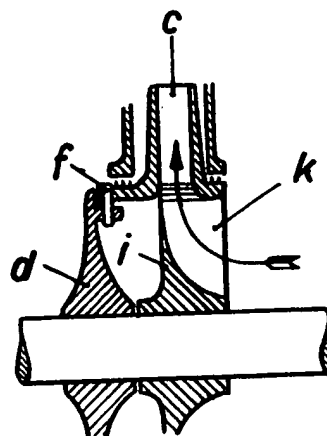


BRITISH

(3)

416  
223 B  
X 416-186  
X 416-135  
X 416-244A

Fig. 1Fig. 2Fig. 3Fig. 4Fig. 5

[This Drawing is a reproduction of the Original on a reduced scale.]

186  
135  
244A.

230  
231

EXAMINER  
COPY  
Div.

# PATENT SPECIFICATION



Convention Date (Germany) : Dec 12, 1935.

466,259

Application Date (In United Kingdom): Dec. 1, 1936.

No. 32950/36.

Complete Specification Accepted : May 25, 1937.

## COMPLETE SPECIFICATION

### Improvements in and relating to Turbo-Blowers

We, AKTIENGESellschaft BROWN, BOVERI & CIE., of Baden, Switzerland, a Swiss Company, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

With rotors of turbo-blowers of the usual kind shown in Fig. 1 two difficulties occur at very high peripheral speeds:

1. Owing to the high centrifugal forces, the hub disc expands to such an extent that, at least temporarily, it becomes loose on the shaft while in operation, whereby frequently the keys are forced out by centrifugal action and through the wheel hammering the operation is disturbed.

2. The cover disc *a*, owing to being subjected to considerably greater stresses than the hub disc *b*, is expanded more than the latter; as it is connected by the blades *c* with the hub disc, this produces a relative rotary motion between the cover disc and the hub disc, the blades being placed at an inclination (tilted) and their rivets being heavily stressed in bending. The consequent stresses are so great that, when running, the yield point is as a rule exceeded and the rotor becomes permanently deformed.

The object of the present invention is to overcome these disadvantages and the invention consists in a rotor for turbo-blowers having a very high speed of revolution, characterised by the feature that it consists of two cover discs which are connected by blades, are of approximately the same dimensions and are symmetrical with respect to the centre plane of the wheel, and a hub disc supporting one of said cover discs by a connecting element or elements which allows the cover discs to expand away from the hub disc but nevertheless transmits the requisite torque.

As the cover discs are now equally stressed, there will no longer be any turning of one disc with respect to the other and the blades will move uniformly with the two discs, so that their rivets are not excessively stressed.

Figs. 2 to 5 of the drawing illustrate

several constructional examples of the invention in section.

In Fig. 2 the cover plate *a* remains the same as in Fig. 1, but the hub disc is divided and consists of the two parts *d* and *e*, which are connected together in a manner known per se by means of radially disposed cylindrical or tapered pins *f*.

As the speed of revolution increases, the part *e* expands more and more and slides along the pins *f* which provide for a permanent accurate centring. The pins may be fixed in the part *d* or in the part *e*.

Similarly a connection in the manner of Fig. 3 would be possible, in which it is established by an elastic ring *g* of a kind known per se.

The symmetrical form of the wheel part proper offers a particularly good opportunity of effecting a balance of the axial forces acting on the wheel and produced by the driving gas, through providing on the hub part *d*, or on the cylindrical part of the cover disc *e* forming an extension on this hub, the requisite packings *h*. In Fig. 4 the two pressures acting on the discs *a* and *e* are equal, whilst on both sides of the hub part *d* the suction pressure must prevail.

The whole mode of construction provides a particularly good opportunity of placing the inner wheel parts of the hub disc, in the present instance the part *d*, somewhat away from the middle of the wheel and of thereby gaining space for the introduction into the interior of the wheel inlet of a suitable guide wheel *i* with blades *k*, which converts the stream of gas in an advantageous manner from an axial stream into a radial stream, as shown in Fig. 5. A similar construction is of course possible with the form shown in Fig. 3.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A rotor for turbo-blowers having a very high speed of revolution, characterised by the feature that it consists of

two cover disc which are connected by blades, are of approximately the same dimensions and are symmetrical with respect to the centre plane of the wheel and a hub disc supporting one of said cover discs by a connecting element or elements which allows the cover discs to expand away from the hub disc but nevertheless transmits the requisite torque.

2. A rotor as claimed in Claim 1, characterised by the feature that the connection between cover discs and hub disc is formed by a plurality of radially disposed, cylindrical or slightly tapered pins, which, although they allow a radial, concentric displacement of the parts connected by them, do not allow a displacement in the peripheral direction.

3. A rotor as claimed in Claim 1, characterised by the feature that a concentrically displaceable connection is established by the interposition of an

elastic, cylindrical ring which is provided with bulbous edges and is caulked in on both sides.

4. A rotor as claimed in Claim 1, characterised by the feature that packing is provided on the periphery of the hub disc or the cylindrical part of the cover disc facing the hub, which lies on the same diameter as the packing on the inlet side of the wheel, whereby a pressure equalising on the hub is effected.

5. A rotor as claimed in Claim 1, characterised by the feature that a guide wheel (i) is provided in the suction opening of the same. (Fig. 5).

6. The improved rotor for turbo-blowers having a very high speed of revolution, substantially as hereinbefore described with reference to the accompanying drawing.

Dated this 17th day of November, 1936.  
MARKS & CLERK.